

Patent-Claims

1. A method of plasma etching, in particular of anisotropic plasma etching, of laterally defined structures in a silicon substrate, using a process gas, at least one passivating material being precipitated at least on the side walls of the laterally defined structures at least from time to time prior to and/or during etching, characterized in that a fluorine-delivering etching gas, containing at least one of the compounds selected from the group  $\text{ClF}_3$ ,  $\text{BrF}_3$ , or  $\text{IF}_5$ , is added, at least from time to time, to the process gas.
2. The method according to Claim 1, characterized in that at least one gas selected from the group  $\text{SiF}_4$ ,  $\text{C}_4\text{F}_8$ ,  $\text{C}_3\text{F}_6$ ,  $\text{C}_4\text{F}_{10}$ ,  $\text{C}_3\text{F}_8$ , or  $\text{C}_2\text{F}_4$ , is also added to the process gas, at least from time to time, as the gas forming the passivating material.
3. The method according to Claim 1, characterized in that at least one gas selected from the group  $\text{O}_2$ ,  $\text{N}_2\text{O}$ ,  $\text{NO}$ ,  $\text{NO}_x$ ,  $\text{CO}_2$ ,  $\text{Ar}$ ,  $\text{NO}_2$ , or  $\text{N}_2$  is added, at least from time to time, to the process gas.
4. The method according to Claim 1, characterized in that at least one additive, in particular,  $\text{CHF}_3$ ,  $\text{CF}_4$ ,  $\text{C}_2\text{F}_6$ ,  $\text{C}_3\text{F}_6$ ,  $\text{C}_4\text{F}_8$ ,  $\text{C}_4\text{F}_{10}$ ,  $\text{C}_3\text{F}_8$ , a fluoroalcano, or  $\text{NF}_3$ , consuming the passivating material, in particular,  $\text{SiO}_2$  or a teflon-type material, is added, at least from time to time, to the process gas.
5. The method according to Claim 1, characterized in

that a light and easily ionizable gas, in particular H<sub>2</sub>, He, or Ne, is added, at least from time to time, to the process gas.

6. A method of plasma etching, in particular of anisotropic plasma etching, of laterally defined structures in a silicon substrate, using a process gas, at least one passivating material being precipitated at least on the side walls of the laterally defined structures at least from time to time prior to and/or during etching, characterized in that NF<sub>3</sub> is added to the process gas, at least from time to time, as an additive NF<sub>3</sub> consuming the passivating material, in particular, SiO<sub>2</sub> or a teflon-type material.

7. The method according to Claim 6, characterized in that a fluorine-delivering etching gas, containing at least one of the compounds selected from the group SF<sub>6</sub>, ClF<sub>3</sub>, BrF<sub>3</sub>, or IF<sub>5</sub>, is added, at least from time to time, to the process gas.

8. The method according to Claim 6, characterized in that at least one gas selected from the group SiF<sub>4</sub>, C<sub>4</sub>F<sub>8</sub>, C<sub>3</sub>F<sub>6</sub>, C<sub>4</sub>F<sub>10</sub>, C<sub>3</sub>F<sub>8</sub>, or C<sub>2</sub>F<sub>6</sub> is added to the process gas, at least from time to time, as the gas forming the passivating material.

9. The method according to Claim 6, characterized in that at least one gas selected from the group O<sub>2</sub>, N<sub>2</sub>O, NO, NO<sub>x</sub>, CO<sub>2</sub>, Ar, NO<sub>2</sub>, or N<sub>2</sub> is added, at least from time to time, to the process gas.

10. The method according to Claim 6, characterized in that a light and easily ionizable gas, in particular H<sub>2</sub>, He, or Ne, is added, at least from time to time, to the process gas.

11. A method of plasma etching, in particular of anisotropic plasma etching, of laterally defined structures in a silicon substrate, using a process gas, at least one passivating material being precipitated on the side walls of the laterally defined structures at least from time to time prior to and/or during etching, characterized in that a light and easily ionizable gas, in particular H<sub>2</sub>, He, or Ne, is added, at least from time to time, to the process gas.

12. The method according to Claim 11, characterized in that at least one fluorine-delivering etching gas, containing at least one of the compounds selected from the group SF<sub>6</sub>, ClF<sub>3</sub>, BrF<sub>3</sub>, or IF<sub>5</sub>, is added, at least from time to time, to the process gas.

13. The method according to Claim 11, characterized in that at least one gas selected from the group SiF<sub>4</sub>, C<sub>4</sub>F<sub>8</sub>, C<sub>3</sub>F<sub>6</sub>, C<sub>4</sub>F<sub>10</sub>, C<sub>3</sub>F<sub>8</sub>, or C<sub>2</sub>F<sub>6</sub> is added to the process gas, at least from time to time, as the gas forming the passivating material.

14. The method according to Claim 11, characterized in that at least one gas selected from the group O<sub>2</sub>, N<sub>2</sub>O, NO, NO<sub>x</sub>, CO<sub>2</sub>, Ar, NO<sub>2</sub>, or N<sub>2</sub> is added, at least from time to time, to the process gas.

15. The method according to Claim 11, characterized in that at least one additive, in particular,  $\text{CHF}_3$ ,  $\text{CF}_4$ ,  $\text{C}_2\text{F}_6$ ,  $\text{C}_3\text{F}_6$ ,  $\text{C}_4\text{F}_8$ ,  $\text{C}_4\text{F}_{10}$ ,  $\text{C}_3\text{F}_8$ , a fluoroalcane, or  $\text{NF}_3$ , consuming the passivating material, in particular,  $\text{SiO}_2$ , or a teflon-type material, is added, at least from time to time, to the process gas.

16. A method of plasma etching, in particular of anisotropic plasma etching, of laterally defined structures in a silicon substrate, using a process gas, at least one passivating material being precipitated on the side walls of the laterally defined structures at least from time to time prior to and/or during etching, characterized in that at least one fluorine-delivering etching gas, containing at least one of the compounds selected from the group  $\text{ClF}_3$ ,  $\text{BrF}_3$ , or  $\text{IF}_5$ , is added, at least from time to time, to the process gas;  $\text{NF}_3$  is added to the process gas, at least from time to time, as an additive consuming the passivating material, and a light and easily ionizable gas, in particular  $\text{H}_2$ ,  $\text{He}$ , or  $\text{Ne}$ , is added, at least from time to time, to the process gas.

17. The method according to Claim 16, characterized in that at least one gas selected from the group  $\text{SiF}_4$ ,  $\text{C}_4\text{F}_8$ ,  $\text{C}_3\text{F}_6$ ,  $\text{C}_4\text{F}_{10}$ ,  $\text{C}_3\text{F}_8$ , or  $\text{C}_2\text{F}_6$  is added to the process gas, at least from time to time, as the gas forming the passivating material.

18. The method according to Claim 16, characterized in that at least one gas selected from the group  $\text{O}_2$ ,  $\text{N}_2\text{O}$ ,  $\text{NO}$ ,  $\text{NO}_x$ ,  $\text{CO}_2$ ,  $\text{Ar}$ ,  $\text{NO}_2$ , or  $\text{N}_2$  is added, at least from time to time, to the process gas.